

Contact	Phone
<i>New York</i>	
Bill Fitzpatrick	1.212.553.4104
Naomi Richman	1.212.553.0014
Gail Sussman	1.212.553.0819
Robert Kurtter	1.212.553.4453
John Nelson	1.212.553.4096
Lisa Washburn	1.212.553.4133
Florence Zeman	1.212.553.4836
<i>Dallas</i>	
Douglas Benton	1.214.220.4381
<i>San Francisco</i>	
Kenneth Kurtz	1.415.274.1737
Eric Hoffmann	1.415.274.1702
Brad Spielman	1.415.274.1719

Evaluating the Use of Interest Rate Swaps by U.S. Public Finance Issuers¹

Strengths and Risks of Interest Rate Hedges, Management Capacity, and Legal Terms are Evaluated in the Context of the Issuer's Overall Credit Position

Introduction

Over the course of the past decade, interest rate swaps and other derivatives have become firmly established in U.S. public finance. Moody's reviews an issuer's use of swaps and other derivatives as a part of our assessment of the issuer's credit strength. When combined with prudent risk management, swaps can improve financial performance by lowering borrowing costs or producing cash flows more likely to meet an issuer's financial objectives. On the other hand, swaps involve certain potential risks that should be evaluated and monitored. Because the impact of interest rate derivatives may change over time, the issuer's capacity to manage the portfolio is important in assessing any potential effects on credit quality. For financially sophisticated, highly rated issuers who are frequent users of derivatives, Moody's analysts may not always conduct a detailed review of each individual trade at the time of a financing, and focus instead on the issuer's swap policies and overall book of swaps. In contrast, when an individual swap can materially affect the credit quality of an issuer or financing, we will perform a detailed review of each swap transaction.

Municipal issuers use a variety of different kinds of interest rate derivatives; some of the most common examples are described in Appendix A. The majority of interest rate derivatives Moody's has reviewed have been floating-to-fixed rate interest rate swaps, and therefore this form of contract will at times serve as the focus of discussion in this report.

Moody's has a three-factor approach evaluating an issuer's or a transaction's exposure to interest rate swaps. The steps taken are:

Factor #1: Swap Management Practices

Factor #2: Potential Financial Impact of Swaps

- A. Cash Flows and/or Net Revenues
- B. Balance Sheet
- C. Counterparty
- D. Future Financial Management

Factor #3: Legal Documentation

This report provides a high-level summary of our three-factor methodology. It then discusses the context in which Moody's reviews interest rate swaps, and provides a more detailed discussion of the three factors.

1. This report was sponsored by Moody's Public Finance Credit Committee, which sets policies that govern the rating process in Moody's Public Finance Group. The Committee was appointed by Moody's Credit Policy Committee to promote transparency and consistency in Public Finance rating practices. The membership of the Committee includes senior managers and analysts in the Public Finance Group, as well as representatives of Moody's Corporate, Structured Finance, and Credit Policy groups. For additional information on Moody's Credit Policy function, please email cpc@moody.com.



Appendices include the following additional materials:

- An overview of common forms of interest rate swaps in public finance (Appendix A, p.16)
- An example of information included in a new issue report (Appendix B, p. 23)
- A sample swap guide used in Rating Committee (Appendix C, p. 24)
- Moody's basic model for assessing basis and tax risk (Appendix D, p. 27)

What's New?

This Methodology is descriptive of Moody's past and current practice, and brings together in one place various factors related to interest rate swaps. The following are some key features discussed in greater detail:

- **Effective Swap Policies** — p. 7 : A summary of issues that may be covered in swap policies is included in a discussion of management practices
- **Measuring Basis Risk** — p. 8, Appendix D on p. 27 : High and low interest rate scenarios that serve as a starting point for measuring basis risk and tax risk when appropriate
- **Measuring Termination Risk** — p. 9: A summary of techniques that are used to evaluate potential exposure to early termination risk
- **Counterparty Ratings** — p. 12 : Moody's views on ratings of swap counterparties

Swap Methodology — Summary

This section of the report provides a high level overview of Moody's approach to analyzing interest rate swaps in the U.S. public finance market. For a more detailed discussion of these factors, please refer to the sections beginning on page 6.

FACTOR 1 — SWAP MANAGEMENT PRACTICES:

The use of swaps adds an additional level of complexity to an issuer's financial management. Moody's assesses the ability of the issuer to identify the potential risks and rewards of derivatives transactions and the issuer's strategy for managing those risks over time, as discussed in the section entitled "Management Practices." Because the impact of derivatives may change over time, in some cases the ability to monitor swap performance and respond effectively to future contingencies may be just as significant as identifying the risks at the outset of the contract.

FACTOR 2 — FINANCIAL IMPACT OF SWAPS:

Interest rate derivatives are reviewed as part of an issuer's overall financial position, considering both the potential advantages and the potential risks.

Potential benefits

Accessing the swap market greatly increases the array of options available to municipal entities in the capital markets. Using swaps can in some circumstances reduce costs or improve cash flows, thereby increasing resources available for debt service and other public purposes and contributing to the issuer's mission. Issuers may consider a variety of derivatives contracts as part of different strategies. Examples include the following:

- **Reducing borrowing costs**, by using floating-to-fixed rate swaps combined with variable rate bonds to achieve costs lower than those available with fixed-rate bonds, or by using fixed-to-floating rate swaps to create synthetic floating rate debt and achieve lower costs without external liquidity or remarketing support.
- **Improving cash flows**, by using basis swaps where the issuer expects the payments received from the counterparty to be greater, over time, than the payments made to the counterparty.
- **Locking in current rates** for future transactions, through forward-starting swaps or swaptions.
- **Matching assets and liabilities**, by using derivatives so that fixed-rate debt is matched with fixed-rate assets and floating-rate debt is matched with floating-rate assets.

Moody's takes the potential benefits of swap transactions into account, recognizing that in the proper circumstances swaps can have a positive effect on an issuer's financial position.

Potential Risks

On the other hand, interest rate swaps involve certain risks that should be considered in credit analysis. To some extent, these same factors are present in managing other aspects of debt portfolios. **Enumeration of these risks here does not imply that Moody's views swaps as the only source of such risk.** The potential risk factors that Moody's considers when evaluating swaps include the following (The risk factors are organized according to the four sub-factors relating to financial impact, although there will be overlap among these categories.):

Cash flows and/or net revenues:

1. **Basis Risk:** the risk that variable rate payments received will be less than variable rate payments they were designed to offset, because the variable rate payments received and the variable rate payments owed are based on different indexes, and the ratio between those indexes changes over time.
2. **Tax Risk:** the risk that the issuer's costs will rise because federal income tax rates fall, or because the tax exemption for municipal debt is eliminated or is modified in a way that reduces its value.
3. **Yield Curve Risk (in particular for Constant Maturity Swaps (CMS)):** The risk that the issuer's cash flow will be adversely affected because the slope of the yield curve is not as the issuer anticipated when entering into the swap. This is an aspect of basis risk for CMS swaps and may affect termination value for CMS and other swaps.
4. **Amortization Mismatch:** the risk that the notional amount of the swap and the outstanding principal amount of the debt intended to be hedged will no longer be equal. Such mismatch may be a feature of the transaction at its inception or may be caused by subsequent events, such as redemption of bonds before maturity or termination of the swap before bond maturity.

Balance sheet:

5. **Termination Risk:** the risk that the municipal issuer will be required to make a payment based on the market value of the swap in connection with an unforeseen termination of the swap, at a time when the market value is negative to the issuer.
6. **Collateral Posting Risk:** the risk that the issuer will be required to post collateral, upon a downgrade of its credit rating or other trigger event at a time when the market value is negative to the issuer.

Counterparty:

7. **Counterparty Risk:** the risk that the counterparty will no longer perform its obligations under the contract, or that the counterparty's credit quality will decline to the point where there is uncertainty about its ability to perform.

Future financial management:

8. **Market Access Risk:** the risk that the issuer will be unable to obtain derivatives contracts when needed in the future on reasonably favorable terms, including new derivatives upon early or scheduled termination of existing hedges ("Rollover Risk").
9. **Loss of Flexibility:** the risk that a swap contract will limit the issuer's debt management options in the future due to an inability to modify or terminate the swap without cost.
10. **Management Complexity.** The risk that, for some issuers, derivatives may add a level of complexity to financial management that will require ongoing commitment of additional resources.

There is overlap among the factors listed; for example, tax risk may be considered a form of basis risk for some swaps, and yield curve risk may be viewed as an aspect of the basis risk of CMS swaps. This discussion, and the list above, may not be exhaustive, and other benefits and risks may arise.

Elements of Financial Impact

The enumerated factors are considered in evaluation of four sub-factors that comprise financial impact:

- **Cash Flows/net revenues:** the potential positive or negative effect on future revenues
- **Balance Sheet:** potential balance sheet effects of future events
- **Counterparty:** the potential for failure of performance by the counterparty
- **Financial Management:** other potential constraints on financial management

FACTOR 3 — LEGAL DOCUMENTATION:

Moody's reviews legal documentation of a swap transaction to understand the terms of the transaction, the risks taken on by the parties, and the remedies available to them. These documents may include, among others, the ISDA Master Agreement, Schedule, Confirmation and Credit Support Annex.

Moody's Evaluates Swaps in the Context of Broader Credit Analysis

Moody's incorporates the strengths and weaknesses of interest rate swaps into bond ratings, in the context of the issuer's overall credit position. This process occurs in two contexts: first, when the issuer enters into a swap in connection with debt issuance where a rating is requested, and second, in periodic reviews of ratings.

Evaluating the Significance of Swaps to an Individual Rating

The issuer's use of interest rate swaps is one of the factors that are considered in assigning a rating. Moody's evaluates the potential impact of derivatives contracts on an issuer's overall financial strength, in light of the issuer's capacity to manage the derivatives portfolio, identify issues and respond to potential changes.

Public finance involves a wide variety of credits, and the significance of swaps varies among sectors. For example, state or local government units issuing tax-backed debt may be able to respond to increased costs by increasing tax revenues. Issuers of debt backed by user fees may find it appropriate to raise rates in response to changing financial performance. In contrast, a structured housing transaction backed by a pool of mortgage loans may have little ability to respond to changes in the impact of derivatives except as allowed for in the original structure. For these reasons, the impact of swaps on particular ratings is determined by individual rating teams using the rating methodologies for the different sectors, as well as the factors discussed here.

Individual Derivatives vs. the Derivatives Portfolio

Moody's provides ratings for some municipal issuers who have large portfolios of interest rate derivatives. Different contracts may have offsetting characteristics, such as non-correlated sensitivities to movements of interest rates. Where appropriate, Moody's considers the overall characteristics of a group of derivatives as well as the characteristics of individual contracts. For clarity, much of the discussion here focuses on individual contracts.

Evaluating a Swap in Connection with Debt Issuance

When an issuer enters into a swap in connection with a debt issuance, Moody's may request information about the proposed swap, along with copies of the swap documents (ISDA Master Agreement, Schedule, Confirmation and Credit Support Annex, if any). If the swap is of sufficient importance to the issuer's rating, we ask to see these documents before the rating is issued. The questions we address include:

- how the swap relates to the debt being rated, and
- the potential impact of the swap on the issuer's future liquidity and financial resources.

The review will focus on the swap related to the new bond issue; however, the swap will be viewed in the context of the issuer's total swap portfolio.

Although the exact approach may vary among different rating teams, the steps involved generally are as follows:

Step 1. Benefits and risks

- Identify the terms of the swap and how it relates to the debt being rated.
- Assess the potential benefits and the key risks.
- If appropriate, discuss with the issuer the reasons for entering into the swap, the risks it has identified, and its strategies for managing those risks.

Step 2. Potential impact on cash flows and net revenues

- Determine the potential for negative impact on the issuer's future net revenues and/or cash flows, because of factors such as basis spread, tax changes, amortization mismatch, and/or yield curve changes.
- Where the risk is potentially material, quantifying potential expense in stress scenarios (using the model discussed in Appendix D as a starting point, adjusted as appropriate to the swap and the issuer's circumstances), and comparing the potential expenses with the resources available to absorb them.

Step 3. Potential impact on the balance sheet

- Determine the potential for collateral posting and/or termination payments by the issuer, by review of the collateral and termination triggers in the documents, and comparing rating-based triggers with the current rating levels.
- Where the risk is potentially material, quantifying potential collateral or termination exposure in stress scenarios (see “Termination Risk” below), and assessing the potential impact of such payments on an issuer’s balance sheet and liquidity.

Step 4. Counterparty

- Identify the counterparty, and determine whether the counterparty’s obligations are supported by any other entities (such as a guarantor).
- Confirm the ratings of the counterparties and other obligors, and verify that the counterparty’s obligations to the issuer are supported by rated a entity.

Step 5. Potential effects on future credit strength

- Identify other factors that may impact future liquidity or balance sheet management, such as reliance on swaps for needed cash flows, reduced flexibility in future debt management, additional complexity, or need for future market access.
- Assess whether the swap impacts the rating, and comment appropriately on any important risk factors in rating related reports.

In our New Issue Report on the transaction, Moody’s may comment on the material provisions of the swap and its impact on our rating. See **Appendix B** for a discussion of information that may be included in reports.

In some cases, if we are comfortable with the issuer’s overall credit quality and pre-established parameters for swap transactions, and the swap risk is relatively small compared to the issuer’s resources, we do not necessarily need to evaluate each swap prior to assigning a rating to the related bond issue, but will consider the swap in our subsequent reviews of the issuer’s credit.

Moody’s analysts often use a Swap Guide as a tool in analyzing a swap and presenting the overall transaction to Rating Committee. An example of a Swap Guide is attached as **Appendix C**. An individual rating team may develop additional criteria for a specific category of credit.

Assessing the Issuer’s Swap Portfolio in Surveillance of Ratings

Moody’s also evaluates an issuer’s derivatives portfolio in periodic reviews of ratings. As a starting point, Moody’s reviews the information about swaps reported in the issuer’s annual audited financial statements, including the number and terms of derivatives contracts and their reported fair value. **The steps to be followed will be the same or very similar to those outlined in the previous section.** Moody’s considers whether the derivatives portfolio constitutes a material credit factor. This depends upon factors including the following:

- The number and complexity of interest rate derivatives
- The size of the swap portfolio compared with the level of the issuer’s resources
- Whether the swap portfolio has caused, or may cause, a material level of changes in cash flows or net revenues
- Whether the swap portfolio has caused, or may cause, any material impact on the balance sheet
- The issuer’s swap management capabilities
- The issuer’s ability to react if the credit becomes stressed, based on levels of available resources and ability to access the markets in a timely fashion

The purpose is to determine whether the risks of the portfolio as a whole are material to the issuer’s financial strength. Different derivative contracts may have offsetting credit affects that should be considered — for example, non-correlated sensitivities to upward or downward movements of interest rates.

If the swap portfolio is material, Moody’s may request additional information from the issuer and conduct more analysis of the potential risks of the swap portfolio, according to the methods described in the next section.

Swap Methodology — Comprehensive Discussion

This section of the report provides a more in-depth discussion of Moody's analysis of interest rate swaps in the U.S. public finance market.

FACTOR 1: SWAP MANAGEMENT PRACTICES

Interest rate swaps add an additional level of complexity to an issuer's debt management. Moody's considers the issuer's capacity to manage the swap portfolio as part of the rating process. For an issuer with fewer or less complex swaps, oversight may be less critical (although it is always important). Issuers with a large or complex swap portfolio, however, should have the capacity and the resources to manage the evolving effects of the swaps on the issuer's credit profile over the long term.

At the time a swap is initiated, Moody's reviews the financial and legal terms of the swap. Depending on the terms of the swap and its relationship to the issuer's finances, issues which may be considered and discussed with the issuer include the following:

- The reasons for entering into the swap, and its relationship to the debt being hedged (if any)
- The anticipated economic benefits and the risks of the swap, and the variables most likely to affect future performance
- Whether the swap is expected to match the related debt in amount and term, and what strategies will be employed if mismatch occurs
- If mismatch may occur, whether termination options are structured to reduce any possible negative impact on the bond program
- Whether the swap is reasonably expected to minimize negative basis spread, given the indexes chosen for variable rate payments
- Whether the issuer has considered responses to unanticipated basis expense and the level of resources available for absorbing such expenses
- The nature of the issuer's legal pledge for swap payments — whether swap payments are limited to a particular indenture or program or constitute a broader general obligation
- Whether scheduled swap payments, termination payments and collateral posting obligations are on parity with or subordinate to bond debt service
- Whether the issuer has analyzed when a termination payment might occur, the range of expected termination payments, and what resources might be available to apply to a termination payment if necessary
- The credit quality of the counterparty
- Whether management has reviewed the legal documents and addressed any significant issues
- The nature of collateral posting obligations
- Whether scheduled payments and/or termination payments will be covered by swap insurance and any implications for the credit

As part of its surveillance of ratings, Moody's reviews an issuer's swap policies (written or otherwise) and management practices. Moody's also reviews the issuer's disclosure about swaps in its financial statements, official statements and other management reports that may be available. Areas of management practice that may be significant include the following:

- Procedures for entering into swaps, including management and board of directors' oversight
- Periodic review of market values of swaps, their relation to the issuer's available resources, and strategies for management of possible termination payments
- The methods employed in reviewing market value of swaps
- Procedures for assuring that periodic swap payments are calculated correctly
- Periodic review of swap basis spread performance and strategies to absorb additional costs and/or improve the performance of the portfolio
- Policies for approval of counterparties
- Procedures for monitoring credit quality of individual counterparties and overall counterparty credit characteristics
- Periodic review of possible collateral posting exposure and plans for providing collateral if necessary

Effective Swap Policies

Moody's considers it to be good practice for an issuer using interest rate swaps to adopt a written swap policy. The policy might be a separate document or a part of an overall debt or liquidity management policy. For an issuer that enters into swaps regularly, Moody's considers a swap policy to be an essential management practice.

Although the content of a swap policy must be determined by each issuer based on its legal authority and management structure, the following are elements that Moody's looks for in a swap policy:

- **Authorization:** The role of the issuer's board (if any) in authorizing swaps, and how authority is delegated to executive officers.
- **Purposes:** The purposes for which the issuer is authorized to enter into swaps, such as hedging interest rate risk on specific debt or assets, reducing borrowing costs, locking in currently available interest rates for future transactions, or improving cash flows. This generally includes a statement that swaps should not be used purely for speculative purposes. It also generally includes citation of legal authority to enter into derivatives.
- **Risk Assessment:** The factors the issuer will consider in determining whether to enter into a swap, and a statement of why the swap is considered to be appropriate given the balance of expected benefits, risks and risk mitigants.
- **Standards for Counterparties:** Any specific minimum standards for acceptable counterparties, such as minimum credit rating levels, levels of experience, and/or guidelines for uncollateralized exposure to a particular counterparty.
- **Terms and Documentation:** The key terms that should be included in each swap (for example, a statement of assets and revenues pledged for swap payments and the level of subordination, if any, of payment priorities). Enumeration of the documents that should be used to record a swap, including standard ISDA documents. The policy may identify the areas to be addressed while leaving flexibility for specific terms.
- **Risk Management Function:** How the issuer organizes the risk management function, including the administrative units responsible. This includes an articulation of how the issuer provides for the personnel and expertise needed to monitor its swap exposure at a level appropriate to the size and complexity of the swap portfolio (either in-house or in combination with outside advisors).
- **Periodic Assessment and Reporting:** The steps the issuer will take to manage its swap portfolio, including periodic assessment of basis spread, counterparty risk, collateral posting risk, termination risk and amortization mismatch, along with strategies to address these risks if it is determined that hedges are having a negative affect on the issuer's credit. A list of reporting requirements and frequency.

FACTOR #2: FINANCIAL IMPACT OF SWAPS

Moody's assesses an issuer's derivatives as one part of an overall financial portfolio. Potential financial impact is broken down into ten areas. These may be viewed as potential risk factors, or as dimensions that may represent a measure of potential benefits and potential risk. To the extent that these factors pose risk, the swaps may not be the sole source of the risk; nevertheless, each of these factors should be considered when derivatives contracts are involved in financial management.

The benefits and risks are used to evaluate four key sub-factors:

- A. **Cash Flows/net revenues:** the potential positive or negative effect on future revenues
 - Primary factors: Basis risk
 - Tax risk
 - Yield curve risk
 - Amortization mismatch
- B. **Balance Sheet:** potential balance sheet effects of future events
 - Primary factors: Termination risk
 - Collateral posting risk
- C. **Counterparty:** the potential for failure of performance by the counterparty
 - Primary factors: Counterparty risk
- D. **Financial Management:** Other potential constraints on financial management
 - Primary factors: Market access
 - Loss of flexibility
 - Management complexity

Risk #1: Basis Risk

The cash flows generated by swaps are a function of the relationship between indexes on which payments are based. For example, for a floating-to-fixed rate swap that hedges tax-exempt variable rate bonds, the issuer may expect the bonds to trade approximately like SIFMA. However, the bonds may trade at a spread above SIFMA, and the percentage of LIBOR included in the swap contract may be greater or less than SIFMA at a particular payment date. Similar issues arise with basis swaps, where the issuer agrees to make variable payments based on one index in exchange for variable payments based on a different index (or percentage of the same index).

Such divergence between the variable rate indexes creates basis spread, which result in additional revenues or costs for an issuer. Under certain conditions, basis spread that is negative to the issuer may materially reduce the issuer's net revenues or cash flows. Even if the correlation between the index rate and the bond rate is high in the long run, short-term mismatches can create cash flow stress at certain points in time.

Moody's considers the potential effect of unanticipated expenses resulting from basis risk, and whether the issuer is likely to have resources available to absorb those expenses. Where basis spread may pose a significant expense (given the terms of the swaps and the notional amount in relation to the issuer's resources), Moody's may quantify one or more stress-case basis expense scenarios. The interest rate model described in Appendix D may be used for this purpose, with modifications as appropriate to the swap portfolio. The issuer's capacity to absorb such additional expense will be included in the rating analysis.

For more structured credits where the bonds are supported by specific payments — for example, housing bonds, where the bonds are backed by payments from fixed-rate mortgages — cash flow tests are a critical part of Moody's rating analysis.² We request that the issuer provide cash flows that include certain stresses designed to measure the ability of the program to absorb basis spread. Separate cashflows model high interest rate and low interest rate environments.

Please see Appendix D for examples illustrating the application of Moody's basis risk and tax risk models.

Risk #2: Tax Risk

In a fixed-rate tax-exempt transaction, tax risk — the risk that reductions in marginal tax rates or other change in law will decrease the value of the tax exemption — is usually borne by the bondholders. There is usually no provision for change in the bondholders' yield upon a change in tax law.

This allocation of risk is usually reversed for tax-exempt variable rate debt. If the tax exemption declines in value to the bondholders because of a decrease in tax rates or other change in tax law, then bondholders will demand a higher rate of return, and the issuer is exposed to tax risk. Swaps where the issuer pays SIFMA may shift the tax risk to the swap counterparty; however, LIBOR-based swaps, while hedging against rises in interest rates, leave the issuer exposed to tax risk. Although the tax risk may be inherent in the variable rate debt, tax risk may affect the effectiveness of the swap. Basis swaps may also involve tax risk to the issuer, such as when the issuer makes payments based on a tax-exempt index and receives payments based on a taxable index.

By using variable rate debt, either unhedged or in combination with LIBOR-based swaps, issuers historically have obtained lower costs of funds. While these lower costs may be a credit positive, the tax risk associated with unhedged variable rate debt or LIBOR-based swaps used to hedge tax-exempt variable rate debt may be significant to certain credits over the long run. Basis swaps also may pose potentially significant risks in certain scenarios. Moody's considers the potential impact of tax risk in increasing the negative basis spread that an issuer might experience (as illustrated in Appendix D).

Risk #3: Yield Curve Risk

CMS swaps may add an additional element of risk because their cash flow performance depends on the future shape of the relevant yield curve (*i.e.*, the relationship between short-term and intermediate-or long-term rates — for example, the relationship between one-month LIBOR and five or ten-year LIBOR). To some extent yield curve risk is present in other swaps because it affects their mark-to-market value. With a CMS swap, an issuer usually makes payments based on a short-term rate, such as one-month LIBOR or SIFMA, and receives payments based on a longer-term rate, such as the ten-year LIBOR swap rate or the ten-year SIFMA swap rate. The issuer's expectation is that because short-term rates tend to be lower than longer-term rates, the issuer will obtain positive cash flow from such an exchange.

However, the issuer may experience cash flow that is less favorable than expected or even negative cash flow, when the relationship of interest rates differs from historical norms. If the swap is priced assuming that the yield curve will be upward-sloping, then the issuer may not achieve the intended benefits, or may lose money, during periods when the yield curve is flat or inverted (short-term rates are equal to or higher than longer-term rates).

² See Rating Methodology — Approach to State HFA Cash Flow Projections, August 2006 (97505)

When evaluating CMS swaps, Moody's considers the potential effects of the future shape of the yield curve on the issuer's finances. Moody's uses an approach similar to that employed in assessing basis and tax risk (see Appendix D). Where the cash flows are material to the rating, Moody's may apply stress cash flows that measure the effects of interest rate environments that adversely affect the CMS swap. In the most common example cited above, where the issuer pays based on short-term rates and receives payments based on long-term rates, Moody's may model the performance of the swap where the yield curve is flat or where the yield curve experiences periods of inversion.

Risk #4: Amortization Mismatch

At the time a swap is entered into, Moody's will consider whether the swap is likely to continue providing an effective hedge over time. A swap that is intended as a hedge for specific debt generally will have an initial notional amount and a term equal to the principal amount of the debt and provision for changes in the notional amount to match scheduled amortization of the debt. Various future events may cause the notional amount of the swap to no longer match the amount of the debt (or asset position) it is intended to hedge. One example is a swap that includes a "knockout" under which swap payments cease if interest rates reach certain levels. The issuer may lose a hedge altogether if the knockout becomes effective.

Another example is mismatch between amortization of bonds and the notional amount of a swap intended as an interest rate hedge. If bond redemptions occur for reasons not contemplated when the swap contract is initiated — for example, because of optional redemption, refunding, special redemption caused by unexpended bond proceeds, or special redemption of revenue bonds caused by prepayment or default of an underlying asset — the notional amount may no longer match the bond amount.

If bond amortization occurs more rapidly than anticipated, the issuer will be "overhedged" and will be paying for a portion of a swap that is no longer needed as a hedge. If the issuer is "in the money" on the swap and the swap contract permits, the issuer may be able to terminate the swap without cost, or with a payment from the counterparty. If the issuer is "out of the money" it may be faced with the choice of making an unforeseen termination payment or making payments on a swap that no longer serves the issuer's objectives. If bond amortization occurs more slowly than anticipated, the issuer will be "underhedged," and a portion of the debt will be unhedged variable rate debt subject to interest rate risk. Either case can lead to additional expense, either in payments on the swap or payments on unhedged variable rate debt.

Risk #5: Termination Risk

Standard swap contracts provide for a mark-to-market settlement upon certain events of default or termination events. In municipal finance swaps, these generally include the standard Events of Default and Termination Events defined in the ISDA Master Agreement, as well as Additional Termination Events included in the Schedule or Confirmation. Common Additional Termination Events include downgrade of the issuer's rating and/or the counterparty's rating below certain levels.

The same concept generally applies if the issuer seeks to terminate the swap voluntarily — for example, because the swap no longer provides an effective hedge, or because it becomes advantageous to refinance related debt. The issuer typically has an option to terminate at market (while the counterparty typically does *not* have that legal option). If the swap is out of the money to the issuer, the issuer's ability to terminate may be constrained by whether it can make a termination payment without undue stress on current resources.

Market movements may work to an issuer's advantage. Floating-to-fixed-rate swaps priced during the recent period of very low interest rates, for example, may have positive value to the issuer as rates rise. The issuer may take advantage of the increased value in the form of a potential termination payment where the issuer has a termination option and termination serves its financial objectives.

On the other hand, termination risk — the risk that the issuer will be required to make a termination payment to the counterparty³ — is potentially a significant risk factor. In some cases, the risk is substantially mitigated because termination is unlikely to occur — for example, where the most likely termination event is a downgrade and the downgrade trigger is significantly below the issuer's rating. However, if a termination *does* occur at a time when the issuer is out the money, the payment may have a significant impact on the issuer's liquidity and reserves. Because one potential cause of a termination would be a lowering of the issuer's rating, termination could occur at a time when the issuer's liquidity is already under stress for other reasons. A demand for a significant cash settlement under such circumstances could compound the decline of the issuer's credit quality.

Moody's also will consider any provisions of prevailing state law that may limit the issuer's authority to make termination payments.

3. The risk of early termination when the counterparty owes a payment to the issuer is discussed below under "Counterparty Risk."

Moody's considers the following in determining whether termination risk is material to an issuer's credit quality.

- The likelihood that termination will occur, which depends on the distance between the issuer's current rating and the rating level that can trigger termination, as well as other provisions, such as what kinds of obligations are included in the cross-default provisions of the legal documents
- The ability of the issuer to make a potential termination payment and still retain sufficient resources to sustain the current rating, which depends on the relationship between potential exposure and the issuer's resources
- The asset pledge supporting termination payments — for example, whether termination payments are general obligations of the issuer, and whether they are subordinate to, or on parity with, payment of rated debt
- Purchased options to termination at par (with no mark-to-market payment) or other contract terms that may reduce exposure to termination risk, such as term-out provisions allowing for termination payments to be made over time
- Swap insurance provisions that may place termination under the control of the insurer (although possibly subject to a reimbursement obligation in favor of the insurer)
- Whether the issuer may be able to access the capital markets to finance a termination payment, or access the swap market to obtain a replacement swap that may absorb all or part of the cost — although if termination is caused by a downgrade of the issuer's credit, the issuer may have difficulty issuing debt or obtaining a new swap on favorable terms

Measuring Potential Termination Risk

Quantifying termination exposure is complex because it depends on both movements of interest rates and changes in the issuer's credit strength. Moody's is in the process of considering models that may provide a standard measure of termination risk, which are expected to be described in an upcoming publication. In current practice, Moody's uses the following sources to estimate potential mark-to-market exposure.

- ***Termination Matrix.*** Moody's may request a "termination matrix" consisting of an estimate of the future fair value of the swap at certain times and based on certain movements of interest rates. The appropriate levels of interest rate shocks will vary depending on the terms of the swap. Moody's has accepted a variety of well-reasoned presentations of termination risk. For floating-to-fixed rate swaps or fixed-to-floating rate swaps, for example, typical parameters for a matrix are as follows:
 - For LIBOR-based floating-to-fixed or fixed-to-floating swaps:
 1. Assume the following shifts in the LIBOR curve: 100 basis points, 200 basis points and 300 basis points upward, and 100 basis points, 200 basis points and (in some cases) 300 basis points downward.
 2. Model termination value in each interest rate scenario at the points: (a) one year forward, (b) five years forward and (c) after one half of the remaining term of the swap.
 - For SIFMA-based floating-to-fixed or fixed-to-floating swaps:
 1. Assume the following shifts in the SIFMA swap curve: 75 basis points, 100 basis points and 200 basis points upwards, and 75 basis points, 100 basis points and (in some cases) 200 basis points downward.⁴
 2. Model termination value in each interest rate scenario at the points: (a) one year forward, (b) five years forward and (c) after one half of the remaining term of the swap.

A termination matrix of this kind has inherent limitations. It usually assumes parallel shifts in interest rates, whereas changes in the shape of the yield curve will potentially affect future swap values. The levels of change may require adjustment over time depending on levels of interest rates and characteristics of yield curves — for swaps entered into in low-rate environments, for example, a 300 basis point downward shift may be too severe to be meaningful. Options to terminate without a mark-to-market payment may need to be evaluated separately. Additional analysis may be requested for a particular swap, including valuation under other interest rate scenarios.

- ***Periodic Mark-to-Market Data.*** Most issuers report the current fair value of each swap to Moody's at least annually. This is usually accomplished by inclusion of the fair value of each swap in the issuer's annual audited financial statements, in accordance with GASB or FASB accounting standards. For issuers with a large amount of swap exposure relative to their financial resources Moody's may request reporting of fair value on a more frequent basis.

4. For SIFMA swaps, Moody's has in some cases accepted termination matrices that model shifts in the LIBOR curve and shifts in the SIFMA-LIBOR ratio as separate components.

- **More Detailed Scenarios.** Where Moody's considers the issuer's swap portfolio to be a material part of its credit analysis, because of the size of the swap portfolio in relation to the issuer's resources and other credit factors, Moody's may ask the issuer to provide additional information or analysis, or Moody's may perform its own additional modeling. This may include scenario testing based on certain stressful assumptions about future interest rates and/or simulations of interest rate paths.

Termination Risk with Rate Locks and Swaptions

An issuer typically enters into a forward-starting swap or rate lock in order to lock in current low interest rates for application to a future financing. When the effective date arrives, the issuer may find it advantageous to make a termination payment rather than allow the swap to go into effect. Although the amount of that payment may be recovered over time as a result of the lower future borrowing costs, the issuer must have available liquid resources to fund the termination payment, or be in a position to include the payment in the bond issue. Moody's may evaluate whether the issuer has considered the range of potential termination costs and has identified resources that might be used to fund a termination payment.

Upfront Swaption Payments

When an issuer sells a swaption, the issuer may receive an up-front cash payment (or a series of payments over time). The payment may represent the full value of potential future interest rate savings. Moody's will inquire why the issuer has entered into the swaption, and what use the issuer will make of the up-front payment. Use of a swaption payment for current purposes, such as funding an operating budget shortfall, may signal weakening credit quality.

Risk #6: Collateral Posting Risk

Some swaps require one or both parties to post collateral for all or part of its mark-to-market exposure to the other party. Collateral posting requirements, if any, are detailed in a Credit Support Annex to the applicable ISDA Master Agreement. The issuer may be required to post collateral, upon demand by the counterparty, when the market value of the swap is negative to the issuer, and the negative value is greater than a specified amount. The amount of collateral required may be the full market value of the swap, or the amount by which the market value exceeds a specified "Threshold Amount." Different Threshold Amounts are often specified for different rating levels. If the issuer obtains insurance on the swap payments (generally in connection with bond insurance), collateral posting may be a function of the insurer's credit, which may reduce the risk with respect to the insured bonds.

Collateral posting is a significant feature in credit analysis between swap counterparties. Posting collateral may have a positive effect in compelling the issuer to reserve against termination risk in stages before a downgrade that is cause for termination. At the same time, Moody's views collateral posting risk as a potentially significant credit issue.

As with termination risk, collateral posting represents a potential future challenge to liquidity. The highest rating trigger at which collateral may be required is often significantly higher than the rating trigger for swap termination. Therefore, a collateral trigger is more likely to occur than outright termination if the issuer's credit quality begins to decline. Posting collateral after a downgrade places additional stress on the issuer's liquidity at a time when its financial resources already have likely been reduced, thus potentially contributing to a further slide in financial condition. If the issuer fails to post collateral, the counterparty may have the right to terminate (which could require a market-value payment). Moody's may quantify the issuer's potential collateral exposure at different rating levels, in light of potential mark-to-market values (see the discussion of Termination Risk above).

The legal structure of the transaction is significant. In particular, Moody's considers whether collateral posting obligations are subordinated to rated debt service or on parity with bond debt service, either explicitly or implicitly (even where termination payments are expressly subordinated).

We will also consider any state law provisions that may limit an issuer's ability to post collateral.

Parallel vs. Non-Parallel Requirements

Sometimes collateral requirements — rating levels and thresholds — are at parallel levels for both the issuer and the counterparty. Collateral triggers where parallel ratings are used for the municipal issuer and the counterparty may not take into account the differences between the municipal rating scale, on which U.S. municipal ratings are based, and the global scale, on which ratings of swap counterparties are based. Moody's has recently provided a detailed discussion of the different scales.⁵ It may be appropriate for the issuer to request different collateral thresholds to apply to the counterparty, reflecting the difference in meaning of the ratings.

5. For a discussion of the global and municipal rating scales, see *Rating Methodology*, The U.S. Municipal Bond Rating Scale: Mapping the Global Rating Scale And Assigning Global Scale Ratings to Municipal Obligations, March 2007 (102249).

Risk #7: Counterparty Risk

Interest rate swaps expose the issuer to counterparty risk — the risk that the counterparty will no longer perform its obligations under the swap, or that its credit quality will decline to the point where there is uncertainty about its ability to perform. If the counterparty is no longer making the payments required of it under a swap that is a hedge against specific debt, the issuer will lose the hedge and will be left with unhedged debt. Moreover, if the counterparty defaults or is affected by a termination event at a time when the swap has a market value that is negative to the issuer, the issuer could be required to make a payment in order to terminate or replace the swap, despite the fact that the counterparty was the cause of the termination. The issuer might be able to arrange for a replacement swap to replace the hedge and absorb part of the termination cost.

In assessing counterparty risk, Moody's considers the following factors:

Counterparty Ratings

Most of the swaps we review involve highly rated counterparties — in the Aa or Aaa range (either directly, or through a guarantee or similar arrangement). Moody's looks for all municipal issuers to face counterparties that are rated at least at investment-grade levels. In general, we consider it good practice to deal with counterparties rated in the A range or higher. Lower ratings may be appropriate on a case-by-case basis; however, we may give closer scrutiny to counterparty risk. For transactions heavily dependent on cash flows, we may quantify the counterparty risk for lower-rated counterparties in the rating analysis.

Diversification

Diversification of the issuer's exposure among a variety of highly rated counterparties may offer a measure of protection against counterparty risk by reducing the effects of weakening credit for a single counterparty. As the number of swaps in an issuer's portfolio increases, diversification may become a more important focus. If the issuer itself has different ratings for different indentures or programs. Diversification will be reviewed separately as it applies to each rating.

Collateral

Collateral posting requirements for the counterparty is a positive factor. Collateral posting may limit the issuer's exposure to counterparty risk for a particular counterparty to the amount of the collateral posting thresholds. Moody's has established no minimum requirements for collateral posting. If there are instances where the level of collateral becomes material, we may look to standards developed for structured finance transactions as a reference point. See the Special Report, [*Framework for De-Linking Hedge Counterparty Risks from Global Structured Finance Cashflow Transactions — Moody's Methodology*](#), (SF73248) May 10, 2007.

As discussed previously under "Collateral Posting Risk," it may be appropriate for collateral thresholds applying to the counterparty to be different than the thresholds applying to the issuer at the same rating levels, reflecting the differences between the municipal and global rating scales.⁶

Risk #8: Market Access

Moody's considers whether the issuer is likely to need additional access to the swap market in the future. For example, if a swap has an initial term that ends before the maturity of the hedged debt, the issuer may intend to obtain a replacement swap when the initial swap expires. Depending upon market conditions and the issuer's credit position, a replacement may not offer the same level of economic benefit as the original hedge. Market access also may become an issue if the issuer decides to terminate or modify an existing swap, either because it is no longer economically beneficial or because the related debt should be restructured. In such cases, we may evaluate the potential impact of loss of the hedge on the issuer's finances.

Risk #9: Loss of Flexibility

In some circumstances, interest rate swaps may complicate the future financial management options available to issuers. If the issuer has the right to refund or otherwise refinance hedged debt, termination or modification of the hedge could cause additional expense. If a swap ceases to be economically beneficial, because of changes in market interest rates, tax law or other circumstances, the issuer may face additional costs in unwinding the swap. Also of concern are situations where the issuer is, in effect, counting on swap cash flows to meet revenue needs, so that a change in swap effectiveness could lead to budget or other revenue issues. Moody's may consider whether such issues are developing or may develop, along with the issuer's ability to respond to such challenges and their potential effects on the issuer's finances.

6. For a discussion of the global and municipal rating scales, see *Rating Methodology*, The U.S. Municipal Bond Rating Scale: Mapping the Global Rating Scale And Assigning Global Scale Ratings to Municipal Obligations, March 2007 (102249).

Risk #10: Management Complexity

As was discussed in the “Management Practices” section, an issuer using swaps should acquire a level of understanding of the factors discussed above that is appropriate to the complexity of the issuer’s portfolio. This may require the commitment of additional resources on a sustained basis, such as additional training, personnel, systems or outside advisors to evaluate swaps at inception and monitor their performance over time.

FACTOR 3: LEGAL DOCUMENTATION

If a swap is entered into at the time a rating is requested, Moody’s may ask to review reasonably final drafts of the swap documents, in order to understand the issuer’s rights and responsibilities before assigning a rating. The following are certain key terms that Moody’s will review.

ISDA Master Agreement

Swap transactions are generally governed by an ISDA Master Agreement entered between the issuer and the counterparty. Moody’s understands that the 1992 version is the industry standard. In general, if an issuer uses the 2002 version of the ISDA Master Agreement, additional analysis may be required because of material differences from the standard terms in the 1992 version.

Schedule

Moody’s may request to review a Schedule to the ISDA Master Agreement before rating the debt associated with the swap.

The Schedule sets out the specific terms of the legal agreement negotiated between the parties; consequently, all parts of the Schedule are significant. Key terms that are generally covered in the Schedule include the following (alternatively, these matters could be addressed in the Confirmation for a particular transaction):

- ***Payments on early termination:*** The Schedule should clearly identify the method selected; Market Quotation/Second Method is the method of calculation most commonly selected. Moody’s reviews any changes to the standard termination provisions. Certain terms, such as a term-out provision allowing the issuer additional time to make a payment, may be beneficial (although not very common in current practice).
- ***Additional termination events:*** Moody’s will review additional termination events and events of default that have been added. In particular, we look for a “downgrade trigger” with respect to the counterparty, so that the issuer can terminate upon downgrade of the counterparty below that level. If there is a downgrade trigger with respect to the issuer, the document should state the rating level for the trigger. It also should clearly state what rating the trigger references (for example, whether it is an issuer rating or the rating of a particular debt issue). Moody’s will consider the distance between the current rating and the trigger events.
- ***Cross-Default:*** Moody’s will assess the nature of the obligations that are cross-defaulted to the swap, in order to determine whether these provisions make termination against the issuer significantly more likely. This includes review of the provisions for Default under Specified Transaction and Cross-Default.
- ***Asset Pledge:*** The Schedule may be reviewed to identify what assets or revenues the issuer is pledging in support of its obligations under the swap. These may be different for regularly scheduled payments and for termination payments. We examine whether the issuer’s obligation is limited to the revenues of a particular bond indenture, or whether the obligation constitutes a general obligation of the issuer.
- ***Priority of Payment:*** The Schedule should identify the level of priority assigned to swap payments in the issuer’s program. If the swap is paid from revenues under the bond indenture, regularly scheduled swap payments generally should not be superior to bond principal and interest. In many cases, termination payments are payable at a subordinate level. Moody’s reviews the terms of legal documents to determine whether collateral posting or termination may impair resources available for future debt service payments.
- ***Credit Support Provider:*** If the counterparty is unrated, Moody’s will review whether a guarantee is in place from a rated entity.

Confirmation

The terms of each swap should be documented with a Confirmation. Moody’s may request a draft of the Confirmation before the related rating action. The Confirmation will generally describe the economic terms of the swap, including notional amount, schedule of changes in notional amount, effective date and scheduled termination date, variable rate index or indexes, calculation and payment dates and (after pricing) fixed rate. We look to see whether the issuer (but not the counterparty) is given an express right to terminate at market (usually subject to its ability to fund any payments due).

Other specific terms that may have a material impact on the risks borne by the issuer. For example, the issuer may have purchased a right to terminate at par with no mark-to-market termination payment, which reduces termination and amortization mismatch risk. On the other hand, if the Counterparty has a right to terminate, Moody's may assess the credit impact of the related debt as if it were unhedged variable rate debt.

Credit Support Annex

Moody's reviews the triggers and thresholds for collateral posting by both the counterparty and the issuer.

Guarantee

If the rating associated with the counterparty's credit is provided by an affiliate of the counterparty, Moody's reviews the Guarantee or other related documents to verify that the issuer has appropriate recourse to the rated entity.

Related Research

Special Comments:

[Increasing Use of Interest Rate Swaps by Local Governments Reflects Low Interest Rate Environment and New Authorizing Legislation, May 2004 \(87180\)](#)

[Moody's Introduces Corporate Equivalent Ratings for Municipal Obligations Under Swap and Taxable Cross Border Transactions, April 2003 \(77844\)](#)

[Swaps and the Municipal Market: The Impact of Swaps and FASB 133 on Municipal Credit Quality, October 2002 \(76388\)](#)

[State Housing Finance Agencies Issue Increasing Amounts of Variable Rate Debt, July 2000 \(58498\)](#)

Rating Methodologies:

[The U.S. Municipal Bond Rating Scale: Mapping to the Global Scale and Assigning Global Scale Ratings to Municipal Obligations, March 2007 \(102249\)](#)

[Approach to State HFA Cash Flow Projections, August 2006 \(97505\)](#)

To access any of these reports, click on the entry above. Note that these references are current as of the date of publication of this report and that more recent reports may be available. All research may not be available to all clients.

Appendix A

COMMON FORMS OF INTEREST RATE DERIVATIVES IN MUNICIPAL FINANCE

The following examples of interest rate swap contracts are included for reference only.

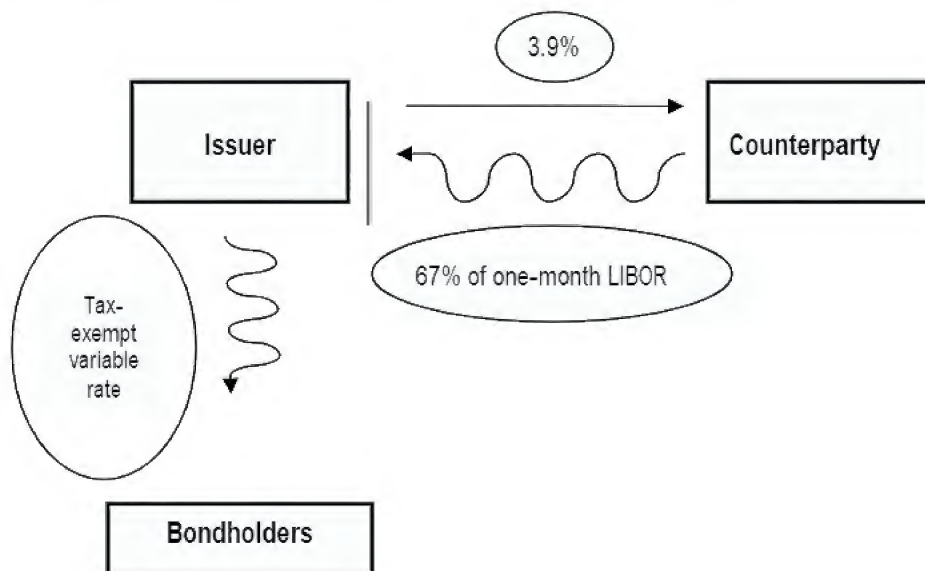
All rates are hypothetical and included solely for purposes of illustration. Actual rates will vary depending upon market conditions at the time a swap is executed.

Floating-to-Fixed-Rate Swap: The most common form of interest rate swap that Moody's has seen in municipal finance. The issuer pays periodic payments to the counterparty based on a fixed rate, and receives periodic payments from the counterparty based on a floating rate. This is commonly used in connection with the issuance of variable rate bonds as a hedge against interest rate risk.

Example:

Notional Amount:	\$100,000,000
Swap Term:	20 years
Issuer Pays:	3.90% (fixed rate per annum)
Issuer Receives:	67% of one-month LIBOR, reset monthly
Payment dates:	Semiannual, each January 1 and July 1
Reset dates:	First Business Day of each month.

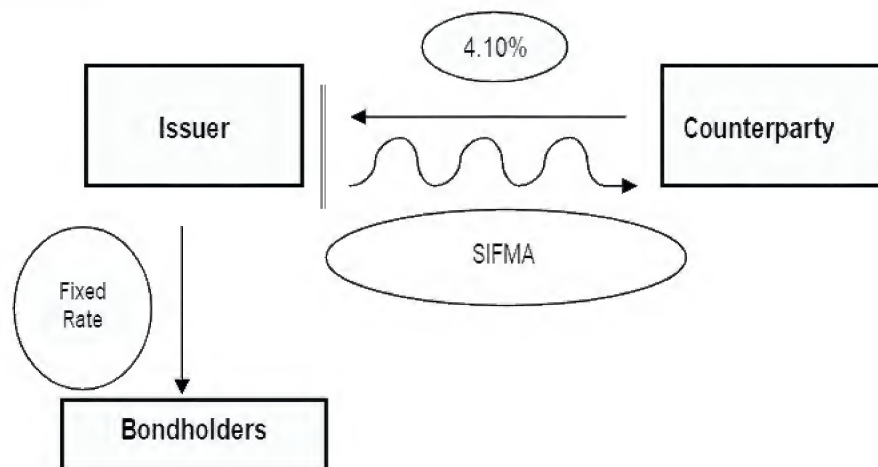
In the example, on each swap payment date, (1) the issuer pays the counterparty an amount based on the fixed rate, and (2) the counterparty pays the issuer 67% of one-month LIBOR, calculated by averaging 67% of monthly resets of one-month LIBOR during the previous six-month period. The issuer makes floating rate payments on the bonds. The payment dates for swap payments often match the payment dates on the bonds, which may be made monthly or semiannually – however, in some cases the swap and bond payment dates are different.



Fixed-to-Floating Rate Swap: The issuer pays periodic payments to the counterparty based on a floating rate, and receives periodic payments from the counterparty based on fixed rate. This may be used to create “synthetic floating rate debt,” with the objective of obtaining potential economic advantages of variable rate debt without the need for remarketing or external liquidity support.

Example:
 Notional Amount: \$100,000,000
 Swap Term: 20 years
 Issuer Pays: SIFMA* (resets weekly)
 Issuer Receives: 4.10%
 Payment dates: Semiannual, each January 1 and July 1
 Reset dates: First Business Day of each month.

In the example, on each payment date, the issuer pays the counterparty an amount based on the weighted average of SIFMA resets during the period and the issuer receives an amount based on 4.10%. The issuer makes fixed rate payments on the bonds.



*The Securities Industry and Financial Markets Association Municipal Swap Index, an index of tax exempt variable rate demand obligations (formerly called BMA).

Basis Swap: The issuer pays periodic payments to the counterparty based on a floating rate index, and receives periodic payments from the counterparty based on a different floating rate index. In some cases, the issuer also receives an additional fixed spread (30 basis points in the example given below); although some basis swaps do not involve an additional spread.

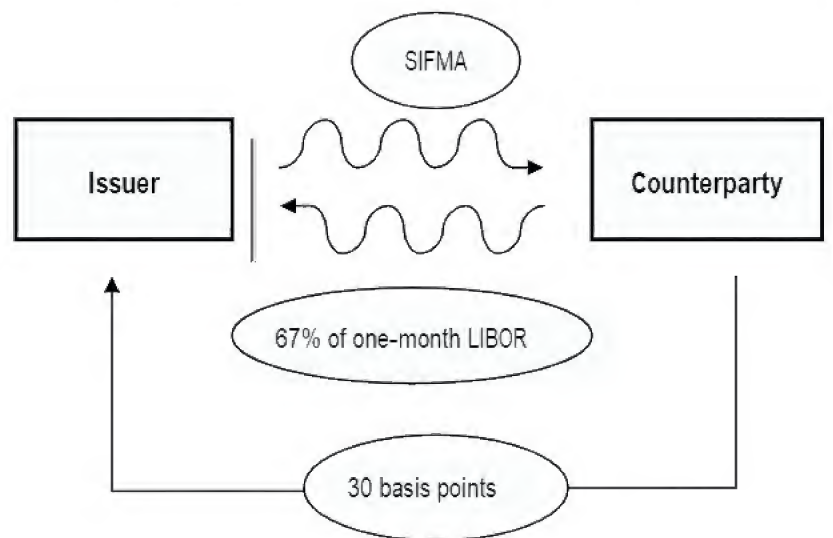
In some cases the payments on one leg of the swap are based on SIFMA, and the payments on the other leg are based on one or three-month LIBOR.

A basis swap may be entered into purely to improve cash flows, based on the expectation that the floating payments received by the issuer will exceed the floating payments made by the issuer.

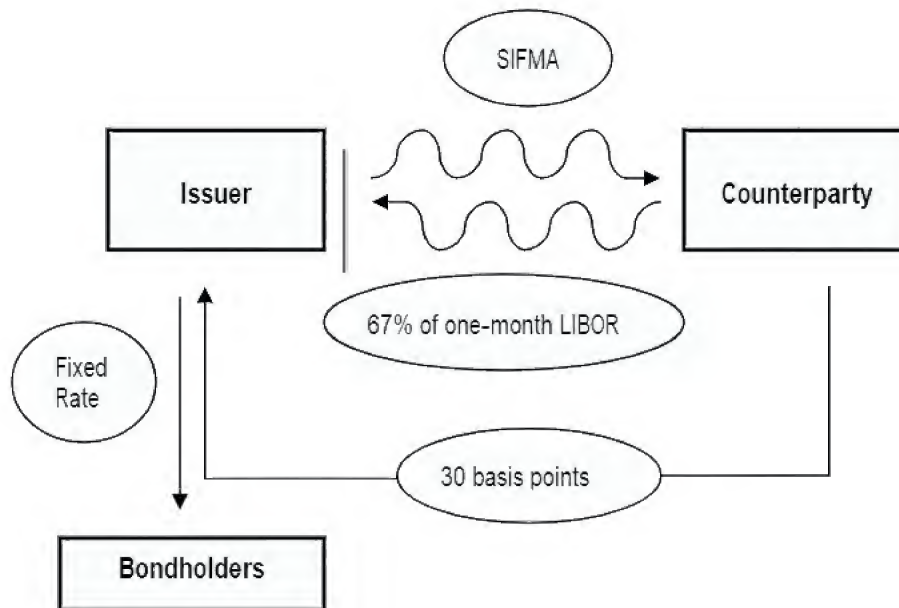
Example:

Notional Amount:	\$20,000,000
Swap Term:	20 years
Issuer Pays:	SIFMA (resets weekly)
Issuer Receives:	67% of one-month LIBOR plus 30 basis points
Payment dates:	Semiannual, each January 1 and July 1
Reset dates:	First Business Day of each month

In the example, on each payment date, the issuer pays the counterparty an amount based on the weighted average of weekly resets of SIFMA over the previous six months. On each payment date, the counterparty pays the issuer an amount based on the weighted average of 67% of monthly resets of one-month LIBOR over the previous six months plus 30 basis points. Not all basis swaps involve an added fixed spread such as shown in this example.



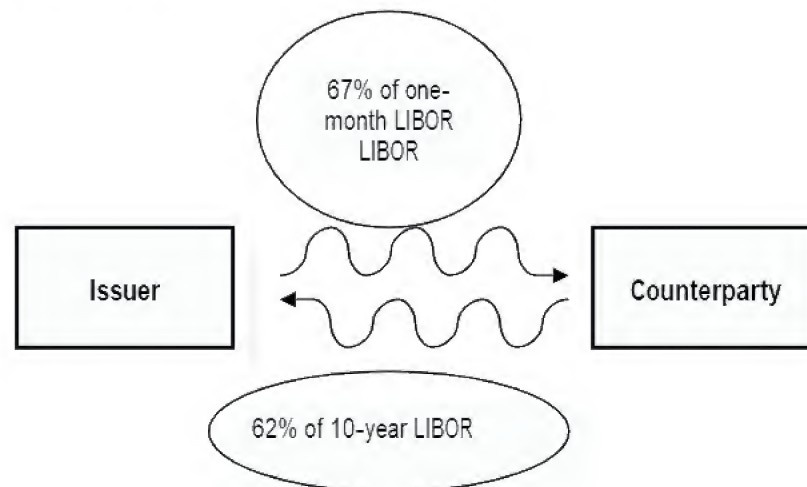
An issuer may enter into a basis swap in combination with long-term fixed rate debt or long-term variable rate debt. The cash flows from the basis swap may be viewed in combination with the bond payments. The issuer's objective is to achieve a lower all-in cost. For example, the diagram below shows the same basis swap illustrated above combined with fixed-rate bonds. The issuer may assume that SIFMA and 67% of one-month LIBOR will be approximately equal, on average, over time, so that the basis swap will lower the borrower's ongoing costs by approximately 30 basis points.



“Constant Maturity” or CMS Swap: A swap in which one stream of variable rate payments is based on a medium or long-term reset rate, while the reset period for swap payments is shorter. Most of the CMS swaps that Moody’s sees are basis swaps where one stream of payment is based on a medium- or long-term reset rate. For example, an issuer might pay a percentage of one-month LIBOR and receive a percentage of ten-year LIBOR.

Example:
Notional Amount: \$30,000,000
Swap Term: 20 years
Issuer Pays: 67% of one-month LIBOR, reset monthly
Issuer Receives: 62% of 10-year LIBOR, reset monthly
Payment dates: Semiannual, each January 1 and July 1
Reset dates: First Business Day of each month

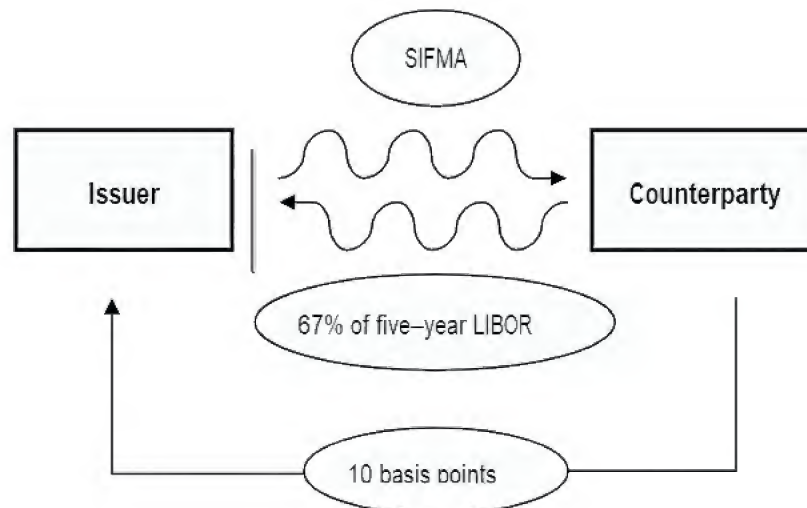
In the example, on each payment date, the issuer pays the counterparty an amount based on the weighted average of monthly resets of 67% of one-month LIBOR. On each payment date, the issuer receives an amount based on the weighted average of 62% of monthly resets of 10-year LIBOR. The issuer’s expectation is that as the LIBOR yield curve steepens, the spread between 10-year LIBOR (received) and one-month LIBOR (paid) will widen, thereby creating positive cash flow for the issuer.



A CMS swap may involve an exchange of payments based on SIFMA and payments based on LIBOR, as in the following example.

Example:
Notional Amount: \$30,000,000
Swap Term: 20 years
Issuer Pays: SIFMA, reset weekly
Issuer Receives: 67% of five-year LIBOR plus 10 basis points, reset monthly
Payment dates: Semiannual, each January 1 and July 1
Reset dates: First Business Day of each month

In this example, on each payment date, the issuer pays the counterparty an amount based on the weighted average of monthly resets of SIFMA over the previous six months. On each payment date, the counterparty pays the issuer an amount based on the weighted average of 67% of monthly resets of five-year LIBOR over the previous six months plus 10 basis points multiplied by the notional amount.



Rate Locks and Swaptions

Municipal issuers enter into certain kinds of forward-starting interest rate hedges. These are generally designed to lock in the benefits of current interest rates for financings that are expected to be closed in the future.

Forward Starting Swap: The issuer enters into a swap contract with a counterparty, and the date on which the exchange of payments begins (the effective date) is deferred to a future date. The swap is most commonly a floating-to-fixed swap. In such a case, the fixed rate the issuer pays on the swap includes a premium for the forward start. Typically, there are two ways such a swap may be used as a rate lock. If the swap is “physically settled,” the swap contract takes effect and the issuer issues variable rate bonds, hedged by the swap. If the swap is “cash settled,” the parties terminate the swap, with an appropriate termination payment, if any.

Swaption: A swaption is an option to enter into or cancel a swap in the future. In most cases, the municipal issuer sells the swaption. In such a case, the issuer grants to the counterparty the option to enter into a swap on certain terms at a fixed date in the future. The counterparty generally makes a payment to the issuer designed to represent the present value of the difference between the strike rate stated in the option and the current market rate. The payment may be made in a lump sum at the time the swaption is entered into or may be paid over time. If the counterparty exercises the option, the parties enter into the swap. The issuer retains the upfront payment regardless of whether the counterparty exercises the option.

As with a forward-starting swap, an issuer may sell a swaption as a means to lock in current rates for a future refunding, thus capturing the value of redemption options attached to the bonds to be refunded. If the counterparty exercises the option, the issuer would refund the related bonds with variable rate bonds, which are hedged by the swap.

Appendix B

ADDRESSING SWAPS IN NEW ISSUE REPORTS

Moody's generally includes a discussion of interest rate swaps in a New Issue Report for related debt. The report will include essential terms of the swap. The following is an example:

Counterparty: ABC Bank

Counterparty Rating: Aaa

Notional Amount: \$30,000,000

Changes in Notional Amount: declines according to scheduled bond amortization

Effective Date: January 1, 2007

Scheduled Termination Date: January 1, 2027

Issuer Pays: 3.50% fixed

Issuer Receives: 67% of one-month LIBOR

Payment dates: semiannually, each January 1 and July 1

Options to terminate: None

Where material, the report will also include discussion of specific risks. For example, it may identify the following:

- The highest Collateral Posting Triggers for the issuer and/or counterparty and the related Thresholds
- Potential impact of additional basis spread, and how Moody's measures the issuer's ability to withstand stressful interest rate scenarios
- Potential termination risk, and how Moody's has compared termination exposure with the issuer's financial resources
- Sources of payment for the issuer's swap obligations, and whether payments are on parity with or subordinate to debt service on rated debt

Appendix C

PFG ANALYST SWAP GUIDE

The following is an example of the information an analyst may assemble in assessing a swap when detailed analysis is considered material. The information considered may vary among PFG rating teams.

Issuer: _____	Analyst: _____
Related Bond Issue (if any): _____	Date: _____
DERIVATIVE DOCUMENTS	
ISDA Master Agreement	<input type="radio"/>
Schedule to ISDA Master Agreement	<input type="radio"/>
Confirmation*	<input type="radio"/>
Credit Support Annex (if any)*	<input type="radio"/>
Guarantee (if any)	<input type="radio"/>
OTHER DOCUMENTS	
Termination Matrix (if applicable)	<input type="radio"/>
Issuer swap Policy (if applicable)**	<input type="radio"/>
<small>* Note: indicates core documents for specific series</small> <small>** Note: only need one copy of these documents (do not need for every deal)</small>	
ITEMS GENERALLY FOUND IN THE CONFIRMATION	
What is the precise legal name of the swap counterparty? Counterparty's rating? Is the Counterparty a derivative products company (DPC)?	
Type? (e.g., swap, swaption, fixed-to-floating, collar, etc.)	
What is the notional amount? Is this amount expected to be reduced when bonds are redeemed? Is a schedule of changes in notional amount included?	
Fixed/floating swaps: What entity is the floating payor?	
What is the basis for calculating floating rate (e.g. LIBOR or SIFMA)? Formula used to calculate floating payments? Is there a floor or ceiling on floating payments?	
What entity is the fixed payor? What are the fixed rate payments?	
What are the payment dates?	
For basis swaps (or other): describe terms	
What is the swap start date? What is the scheduled swap termination date?	

Are scheduled swap payments on parity with or subordinate to debt service?
Are termination payments on parity or subordinate?
Does either party have an express option to terminate at market value? Under what circumstances?
What is the source of scheduled swap payments by the issuer? Is it limited to specific assets of the issuer?
What is the source of termination payments by the issuer? Is it limited to specific assets of the issuer?
ITEMS GENERALLY FOUND IN THE SCHEDULE OR IN THE CONFIRMATION
What additional or modified Events of Default and Additional Termination Events are specified for the issuer?
What method is specified for determining termination payments (e.g., Market Quotation/Second Method)? Are there special provisions for determining the amount of payment in any circumstances?
What additional or modified Events of Default and Additional Termination Events are specified for the counterparty?
What method is specified for determining termination payments (e.g., Market Quotation /Second Method)? Are there special provisions for determining the amount of the payment in any circumstances?
Does either party have an option to terminate at par at any time (without payment due as a result of the termination)? Under what circumstances?
Are there provisions to transfer the swap to a different counterparty under certain circumstances (for example, rating downgrade of a party)?
Is there a guarantee of the counterparty's obligations? Are there any conditions to the guarantor's obligations?
What is the frequency of payments under the swap?
ITEMS GENERALLY FOUND IN THE CREDIT SUPPORT ANNEX
Is the issuer required to post collateral? At what rating level is posting required, and at what thresholds for each rating level?
Is the counterparty required to post collateral? At what rating levels is posting required, and at what thresholds for each rating level?
MARKET TERMINATION
Has an assessment been made of the level of potential exposure to termination payments?
Has the issuer (or its advisors) prepared a termination matrix showing sensitivities of the future market value of the swap to interest rate movements?
Has the issuer (or its advisors) been asked to provide any additional analysis of potential termination values?

BASIS SPREAD

Has an assessment been made of the level of potential exposure to basis spread?

If the swap may expose the Issuer to tax risk, has an assessment been made of potential exposure to basis spread after changes in tax law or tax rates?

ADDITIONAL ITEMS

What is the mark-to-market value of existing swaps as of the date of the most recent audit? Is more current mark-to-market value of existing swaps needed?

Appendix D

INTEREST RATE STRESS MODEL

Moody's uses the following interest rate stress parameters as part of its analysis when changes in interest rate environments may be material. The model includes a *high-interest-rate scenario* and a *low interest-rate scenario* to test the effects of both relatively high and relatively low short-term interest rates on payments that are affected by levels of interest rates.

These interest rates are a starting point when changes in interest rates are material. They may be applied to evaluate the impact of a single swap, or to evaluate the impact of a portfolio of swaps. For example, they are used in measuring exposure to basis risk, such as when floating-to-fixed rate swaps are used to hedge interest rate risk for variable rate bonds. They may also be used as part of the analysis of basis risk for basis swaps and CMS swaps.

Moody's determined the rates that should be used by analyzing one-month LIBOR data from January 1970 through January 2006 and BMA (now SIFMA) data from July 1989 through January 2006. In addition, we separately reviewed data from January 1996 through January 2006, because this period included a prolonged period of low short-term interest rates.

The high, low and mean values, and the standard deviations, of the various samples were calculated. We then assigned several weighting scenarios to our results to adjust for substantial volatility in LIBOR over the 36 year period. Furthermore, the log-normal distribution of the sample was calculated and analyzed. We also considered the magnitude and duration of changes in interest rates. All of these factors were taken into account in order to determine the high and low interest assumptions for these parameters.

Low-Interest Scenario:

Taxable Rates: one-month LIBOR assumed to be 2.10%

Tax-exempt Rates: SIFMA assumed to be 1.68% (80% of the applicable taxable rate)

High Interest Rate Scenario: One of two different sets of assumptions may be used:

Ramp-up Stress:

Taxable Rates:

Starting point is current one-month LIBOR, then

Years 1-5: Increase in equal, straight-line increments for current LIBOR to 10.5%

Years 6-10: Hold at 10.5%

Years 11-15: Reduce in equal, straight-line increments from 10.5% to 7.5%

Years 16 on: Hold at 7.5%

Tax Exempt Rates: SIFMA is assumed to be 67% of applicable one-month LIBOR

Where tax risk is material, SIFMA is assumed to be 75% of applicable one-month LIBOR after 5 years

Flat Rate Stress:

Taxable Rates: one-month LIBOR assumed to be 8.6%

Tax-exempt Rates: SIFMA is assumed to be 67% of applicable one-month LIBOR

Where tax risk is material, SIFMA is assumed to be 75% of applicable one-month LIBOR after 5 years

Trading Level of Variable Rate Bonds: Where tax exempt variable rate bonds are involved, Moody's assumes that the bonds reset at the applicable SIFMA rate plus five basis points (or 10 basis points for bonds subject to Alternative Minimum Tax (AMT)).

The following pages illustrate the application of the model to a case involving tax exempt variable rate bonds combined with a floating-to-fixed rate swap based on one-month LIBOR. The same or similar interest rate assumptions may be used in other contexts.

APPLYING MOODY'S BASIS AND TAX RISK MODEL

The following is an example of modeling variable rate bonds combined with a floating-to-fixed-rate swap to measure potential basis and tax risk. The model is used here to determine an additional "expense" expressed as different percentages of the notional amount at different times.

First Scenario: Rising Interest Rates Using Ramp-Up

Assumptions:

Ramp Up one-month LIBOR from Current Levels to 10.5% over 5 years; Hold at 10.5% for five years; ramp back down over five years to 7.5% and then hold
 SIFMA=67% of LIBOR for the first five years
 Thereafter, SIFMA = 75% of LIBOR (to model Tax Risk)

Terms of the Transaction:

Actual One-Month LIBOR at Inception: 4.40%

Swap Terms

Term: 30 Year
 Issuer Pays - Fixed Rate: 3.50%
 Issuer Receives - Variable Index: 64% of One-Month LIBOR plus 0.25%

Bond Tax Status: Tax-Exempt AMT

Moody's Assumptions:

Assumed One-Month LIBOR: Varies

SIFMA as % of One-Month LIBOR:

Without tax risk: 67%

When tax risk applies: 75%

Bond Spread Over Index: 0.10%

Year:	One	Two	Three	Four	Five	six Through 10	11	12	13	14	15 and after
Assumed LIBOR Rates:	4.40%	5.62%	6.84%	8.06%	9.28%	10.50%	9.90%	9.30%	8.70%	8.10%	7.50%
Variable Rate Swap Payment Received:											
64% of LIBOR plus 25 Basis points	3.07%	3.85%	4.63%	5.41%	6.19%	6.97%	6.59%	6.20%	5.82%	5.43%	5.05%
Variable Rate Payment on Bonds (No Tax Risk):	2.95%	3.77%	4.58%	5.40%	6.22%	7.04%	6.63%	6.23%	5.83%	5.43%	5.03%
Additional Expense (Receipt) (No Tax Risk):	-0.12%	-0.08%	-0.04%	-0.01%	0.03%	0.08%	0.05%	0.03%	0.01%	-0.01%	-0.03%
Tax risk:											
Variable Rate Payment on Bonds (With Tax Risk):						7.88%	7.43%	6.98%	6.53%	6.08%	5.63%
Additional Expense (Receipt) (With Tax Risk):						0.91%	0.84%	0.77%	0.71%	0.64%	0.57%
Additional Cost of Bond Spread Over Index:	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%
Total Expense:	-0.02%	0.02%	0.06%	0.09%	0.13%	1.01%	0.94%	0.87%	0.81%	0.74%	0.67%
Swap Fixed Rate:	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%
Total Payment:	3.48%	3.52%	3.56%	3.59%	3.63%	4.51%	4.44%	4.37%	4.31%	4.24%	4.18%

This is an example; the correct payments for each transaction will depend on the terms of the transaction.

APPLYING MOODY'S BASIS AND TAX RISK MODEL

Second Scenario: High Interest Rates Using Flat Stress

Assumptions:

One-month LIBOR = 8.6%

SIFMA = 67% of LIBOR for the first five years

Thereafter, SIFMA = 75% of LIBOR (Tax Risk)

Terms of the Transaction:

One-Month LIBOR at inception: 4.4%

Swap Terms

Term: 30 Year
Fixed Rate: 3.50%
Variable Index: 64% of One-Month LIBOR plus 0.25%

Bond Tax Status: Tax-Exempt AMT

Moody's Assumptions:

Assumed One-Month LIBOR: 8.60%
SIFMA as % of One-Month LIBOR:
Without tax risk: 67%
When tax risk applies: 75%

Bond Spread Over Index: 0.10%

Year:	One	Two	Three	Four	Five	six Through 10	11	12	13	14	15 and after
Assumed LIBOR Rates:	8.60%	8.60%	8.60%	8.60%	8.60%	8.60%	8.60%	8.60%	8.60%	8.60%	8.60%
Variable Rate Swap Payment Received: 64% of LIBOR plus 25 Basis points	5.75%	5.75%	5.75%	5.75%	5.75%	5.75%	5.75%	5.75%	5.75%	5.75%	5.75%
Variable Rate Payment on Bonds (No Tax Risk):	5.76%	5.76%	5.76%	5.76%	5.76%	5.76%	5.76%	5.76%	5.76%	5.76%	5.76%
Additional Expense (Receipt) (No Tax Risk):	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
Tax risk:											
Variable Rate Payment on Bonds (With Tax Risk):						6.45%	6.45%	6.45%	6.45%	6.45%	6.45%
Additional Expense (Receipt) (With Tax Risk):						0.70%	0.70%	0.70%	0.70%	0.70%	0.70%
Additional Cost of Bond Spread Over Index:	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%
Total Expense:	0.11%	0.11%	0.11%	0.11%	0.11%	0.80%	0.80%	0.80%	0.80%	0.80%	0.80%
Swap Fixed Rate:	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%
Total Payment:	3.61%	3.61%	3.61%	3.61%	3.61%	4.30%	4.30%	4.30%	4.30%	4.30%	4.30%

This is an example; the correct payments for each transaction will depend on the terms of the transaction.

APPLYING MOODY'S BASIS AND TAX RISK MODEL

Third Scenario: Low Interest Rates

Assumptions:

One-Month LIBOR = 2.10%

SIFMA = 80% of LIBOR

Terms of the Transaction:

One-Month LIBOR at Inception:	4.40%
-------------------------------	-------

Swap Terms

Term:	30 Year
Fixed Rate:	3.50%
Variable Index:	64% of One-Month LIBOR plus 0.25%

Bond Tax Status:	Tax-Exempt	AMT
------------------	------------	-----

Moody's Assumptions:

Assumed One-Month LIBOR:	2.10%
SIFMA as % of One-Month LIBOR:	80%

Bond Spread Over Index:	0.10%
-------------------------	-------

Year:	One Through 30
-------	-------------------

Assumed LIBOR Rates:	2.10%
----------------------	-------

Variable Rate Swap Payment Received:

64% of LIBOR plus 25 Basis points	1.59%
--------------------------------------	-------

Variable Rate Payment on Bonds (No Tax Risk):	1.68%
---	-------

Additional Expense (Receipt):	0.09%
-------------------------------	-------

Basis Expense:	0.10%
----------------	-------

Total Expense:	0.19%
-----------------------	--------------

Swap Fixed Rate:	3.50%
------------------	-------

Total Payment:	3.69%
----------------	-------

This is an example; the correct payments for each transaction will depend on the terms of the transaction.

PAGE INTENTIONALLY LEFT BLANK

To order reprints of this report (100 copies minimum), please call 1.212.553.1658.
Report Number: 104186

Author

Bill Fitzpatrick

Editor

Naomi Richman

Production Specialists

*Yung Louie
Cassina Brooks*

© Copyright 2007, Moody's Investors Service, Inc. and/or its licensors and affiliates including Moody's Assurance Company, Inc. (together, "MOODY'S"). All rights reserved. ALL INFORMATION CONTAINED HEREIN IS PROTECTED BY COPYRIGHT LAW AND NONE OF SUCH INFORMATION MAY BE COPIED OR OTHERWISE REPRODUCED, REPACKAGED, FURTHER TRANSMITTED, TRANSFERRED, DISSEMINATED, REDISTRIBUTED OR RESOLD, OR STORED FOR SUBSEQUENT USE FOR ANY SUCH PURPOSE, IN WHOLE OR IN PART, IN ANY FORM OR MANNER OR BY ANY MEANS WHATSOEVER, BY ANY PERSON WITHOUT MOODY'S PRIOR WRITTEN CONSENT. All information contained herein is obtained by MOODY'S from sources believed by it to be accurate and reliable. Because of the possibility of human or mechanical error as well as other factors, however, such information is provided "as is" without warranty of any kind and MOODY'S, in particular, makes no representation or warranty, express or implied, as to the accuracy, timeliness, completeness, merchantability or fitness for any particular purpose of any such information. Under no circumstances shall MOODY'S have any liability to any person or entity for (a) any loss or damage in whole or in part caused by, resulting from, or relating to, any error (negligent or otherwise) or other circumstance or contingency within or outside the control of MOODY'S or any of its directors, officers, employees or agents in connection with the procurement, collection, compilation, analysis, interpretation, communication, publication or delivery of any such information, or (b) any direct, indirect, special, consequential, compensatory or incidental damages whatsoever (including without limitation, lost profits), even if MOODY'S is advised in advance of the possibility of such damages, resulting from the use of or inability to use, any such information. The credit ratings and financial reporting analysis observations, if any, constituting part of the information contained herein are, and must be construed solely as, statements of opinion and not statements of fact or recommendations to purchase, sell or hold any securities. **NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE ACCURACY, TIMELINESS, COMPLETENESS, MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE OF ANY SUCH RATING OR OTHER OPINION OR INFORMATION IS GIVEN OR MADE BY MOODY'S IN ANY FORM OR MANNER WHATSOEVER.** Each rating or other opinion must be weighed solely as one factor in any investment decision made by or on behalf of any user of the information contained herein, and each such user must accordingly make its own study and evaluation of each security and of each issuer and guarantor of, and each provider of credit support for, each security that it may consider purchasing, holding or selling.

MOODY'S hereby discloses that most issuers of debt securities (including corporate and municipal bonds, debentures, notes and commercial paper) and preferred stock rated by MOODY'S have, prior to assignment of any rating, agreed to pay to MOODY'S for appraisal and rating services rendered by it fees ranging from \$1,500 to approximately \$2,400,000. Moody's Corporation (MCO) and its wholly-owned credit rating agency subsidiary, Moody's Investors Service (MIS), also maintain policies and procedures to address the independence of MIS's ratings and rating processes. Information regarding certain affiliations that may exist between directors of MCO and rated entities, and between entities who hold ratings from MIS and have also publicly reported to the SEC an ownership interest in MCO of more than 5%, is posted annually on Moody's website at www.moody.com under the heading "Shareholder Relations — Corporate Governance — Director and Shareholder Affiliation Policy."